EXECUTIVE SUMMARY

Introduction

PROPOSED ACTION

The In Search of Truth Community (I'SOT) has applied for partial funding from the National Renewable Energy Laboratory (NREL), to demonstrate the development and field-verification of innovative geothermal direct-use system concepts. NREL is a laboratory operated by a private contractor for the United States Department of Energy (DOE). This funding would assist in the construction and operation for 3 years of several components of a district heating system for the I'SOT community located in Canby, Modoc County, California. The geothermal district heating system would include a 5,400-foot pipeline that would discharge geothermal effluent to the Pit River (see Figure ES-1).

No material costs are to be funded by DOE. DOE funding for the Canby District Heating Project would reimburse the following project components:

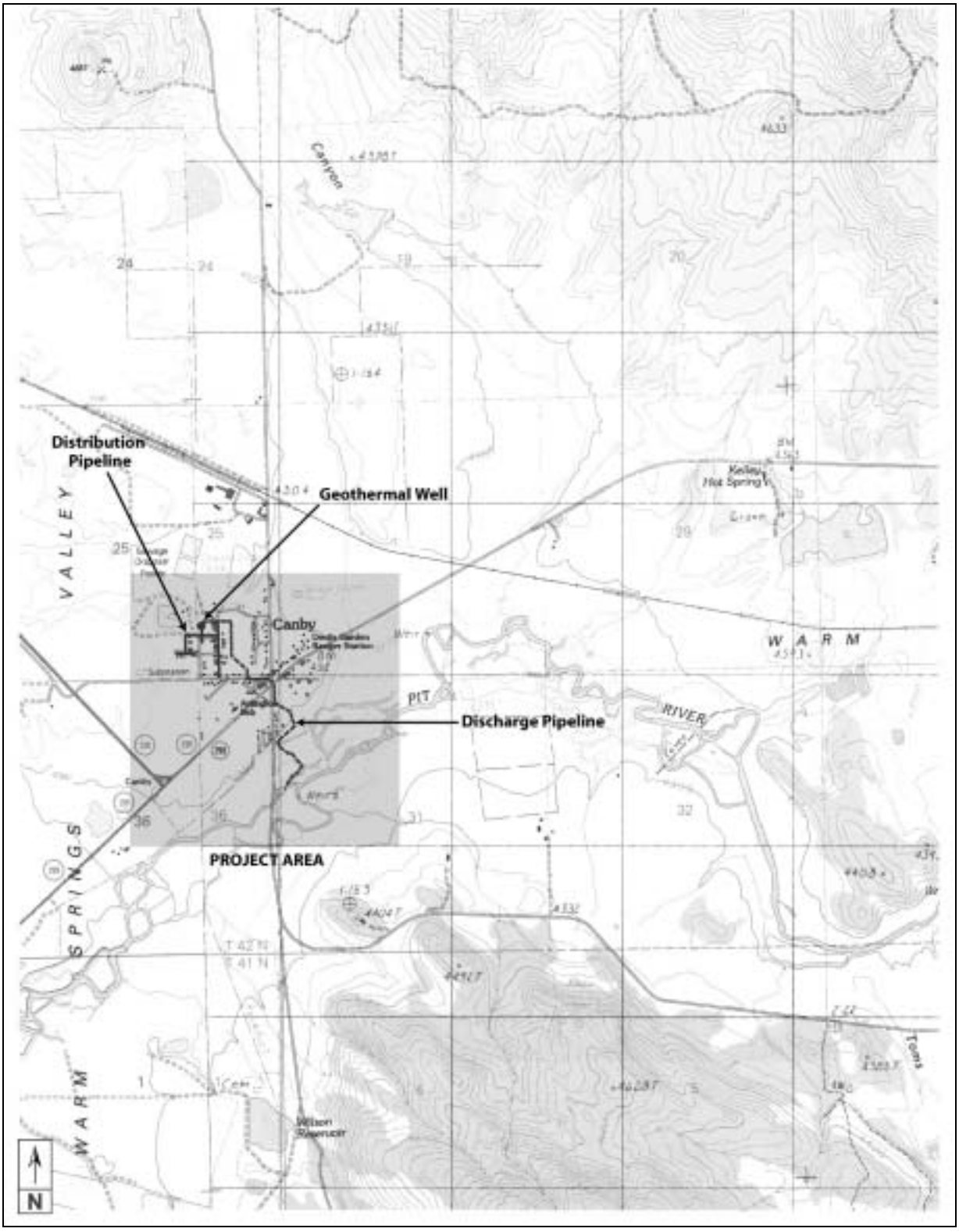
- Permitting Costs
- Engineering Costs
- System Installation labor
- Installation and implementation of the data gathering system for DOE Research and Development purposes

PURPOSE AND NEED

The purpose of the proposed action is to construct and operate a direct-use heating system for the I'SOT Community in Canby, California. This project would construct the system piping and discharge pipeline required for the direct-use system to reduce costs and dependence on propane for power.

The need for the proposed action has been established by the U.S. Congress in the Geothermal Steam Act of 1970 and by the California legislature in the Warren-Alquist Act of 1974, both of which encouraged

Figure ES-1: Proposed Project Area



SOURCE: USGS ET AL 2002

geothermal development as a means to diversify energy supplies. Other acts (including the Federal Land Policy and Management Act of 1976, the Public Utility Regulatory Policies Act of 1978, and the National Materials and Minerals Policy, Research, and Development Act of 1980) also identify the need to develop alternate energy resources.

ENVIRONMENTAL REVIEW PROCESS

NEPA Document

The DOE is the federal lead agency for evaluating the project under the National Environmental Policy Act (NEPA). The DOE must determine whether to provide funding for the proposed project. As required by NEPA, this EA examines the expected individual and cumulative impacts of the proposed project. The EA also identifies means to minimize potential adverse impacts (mitigation measures) and presents an evaluation of reasonable alternatives to the proposed project, including the No Action alternative. The DOE is the only federal agency with responsibility for approving or denying the partial funding for the project and therefore is the lead agency in preparing this EA.

The DOE prepared this EA to provide the public and responsible agencies with information about the project and its potential effects on the local and regional environment. This EA was prepared in compliance with NEPA requirements.

Public Review

The scoping process for the Canby District Heating Project was initiated in September 2002 with distribution of an Interested Parties letter to agencies, citizens, tribal members, and public interest groups. A project kick-off meeting was held in Canby to present information about the proposed project and to solicit input from agencies and tribal members. The key issue raised by U. S. Fish and Wildlife Service (USFWS) was the effects of mercury in the discharge effluent on bald eagles. The main issue raised by the Pit River tribal members was potential for identifying cultural resources during excavation for project construction. Comment letters received in response to the DOE scoping letter are included in Appendix A.

This EA presents the DOE's analysis of the proposed action and findings of the potential environmental effects of the proposed action. The EA was distributed for 30 days public review. Government agencies, interested organizations, and members of the public were invited to submit written comments on this Draft EA. After the 30-day comment period ended, the DOE reviewed and responded to the comments, conducted additional environmental analysis and revised the Draft EA if needed, and prepared a Final EA. The DOE Golden Office Field Manager will make a NEPA determination based upon the entire body of evidence gathered for the project, including the EA and all public comments.

Background

The DOE Idaho Operation office previously granted I'SOT funding to drill an exploratory well in 1998. The California Division of Oil, Gas, and Geothermal Resources (DOGGR) conducted an environmental review for the construction of the well under the California Environmental Quality Act (CEQA) in 1999. The environmental review resulted in a Mitigated Negative Declaration under CEQA. Initial exploration drilling for the geothermal resource for the Canby Geothermal project resulted in the completion of a production well in June 2000.

In January 1999, I'SOT responded to a geothermal Research and Development solicitation from the California Energy Commission (CEC) and was awarded a materials only award. Modoc County Planning Department provided environmental review under CEQA for the development and use of the district heating system in 2001. I'SOT is now requesting additional funding for completion of the project from NREL.

Overview of the Proposed Action

PROPOSED ACTION

The proposed project would include the construction and operation of a geothermal district heating system for the I'SOT Community in Canby, California. A potential future phase of this project could include drilling of an additional well to facilitate the injection of geothermal fluid and eliminate the discharge to the Pit River. This future phase is projected to occur in 5 to 10 years, contingent on funding sources and the completion of future environmental review.

As part of the Canby Geothermal project, I'SOT proposes several activities on their privately held property in the town of Canby. I'SOT proposes to:

- Produce up to 60 gallons per minute of geothermal fluid from an existing well;
- Construct a mechanical and control building;
- Construct a food service and laundry building;
- Construct and operate a district heating system that would utilize the local geothermal resource (naturally occurring hot groundwater) as the heat source;
- Retrofit existing water heaters and space heaters to use municipal water heated by the geothermal fluid;
- Construct a geothermal effluent treatment system to remove heavy metals from the geothermal fluids; and,
- Construct approximately 5,400 feet of discharge pipeline to the Pit River for disposal of the geothermal fluids.

PROJECT LIFESPAN AND DECOMMISSIONING

Construction of the proposed project would take approximately 3 months, and the planned period of operation is 40 to 50 years. At the end of the project lifespan, the project would be decommissioned. Decommissioning would involve removal of the mechanical equipment from the central heating plant. This equipment could be salvaged to recover the metal in the plate heat exchangers. Upon decommissioning, the geothermal well would have to be plugged and abandoned in accordance with Department of Oil, Gas and Geothermal Resources (DOGGR) regulations. The mercury filter in the system at the time would be removed from the project site, and if not salvaged, then sent to a Class I hazardous materials land fill. The pipelines would be left buried with caps or put to other uses such as carrying irrigation water.

Alternatives to the Project

DEFINITION OF ALTERNATIVES

NEPA requires that all lead agencies investigate a reasonable range of alternatives to a proposed project, or to its location that could feasibly achieve the proponent's objectives of the proposed action as defined in the purpose and need for the Project described in Section 1.2 [40 CFR 1502.14(a)]. I'SOT evaluated a range of alternatives during the scoping of the environmental review process. The range of alternatives to the proposal submitted by I'SOT is limited to those alternatives that meet the basic purpose and need (objectives) for the proposed project and are reasonable. To meet the purpose and need for the proposed I'SOT project, and to be within the scope of this analysis, the alternatives considered in the EA were limited to those alternatives that are:

- A geothermal district heating project
- Located on I'SOT property
- Located in areas that could accommodate the proposed facilities (distribution piping, pipeline, mechanical building) with sound engineering and environmental practices
- Economically feasible and viable.

The lead agency has considered various alternatives for the project throughout the EA process, including evaluation of issues raised in the scoping process and during development of the EA. I'SOT also considered a variety of alternatives in developing its proposal. Some of these alternatives were not considered in detail in the EA because one or more of the following conditions were met; the alternative project:

- Did not meet the purpose and need described above
- Was beyond the scope of analysis in the EA
- Would not be technically feasible
- Would have greater adverse environmental effects than would the proposed action

NO ACTION ALTERNATIVE

Under the "No Action" alternative, the proposed district heating system would not be funded by NREL/DOE. The proposed project could proceed if alternative funding was secured by I'SOT. Without funding by DOE, I'SOT would not be reimbursed for costs resulting from permitting efforts, engineering consultation, and system installation costs. No data gathering system would be installed for DOE research and development (R&D) purposes.

ALTERNATIVES CONSIDERED BUT ELIMINATED

The alternatives considered, but not studied in detail due to feasibility or economic issues include:

- Alternative discharge pipeline routes
- Discharge to a created wetland
- Drilling of an injection well for use in lieu of discharge of geothermal effluent to the Pit River

Alternative discharge pipeline routes included County Road 54 through 198 ft. of wetlands and a route through 1,083 ft. of wetlands. The proposed route affects the least amount of wetland habitat.

The pipeline was originally designed to discharge to a section of wetlands that would act as a biofilter for the geothermal effluent. This wastewater-type wetland filter was eliminated as it would alter and degrade the type of jurisdictional wetlands in the project area.

The proposed project does not include an injection well for the disposal of the spent geothermal fluid after heat exchange. Drilling of an addition well in the general vicinity for injection of the spent geothermal fluid would cost an additional estimated $555,000 compared to the 5,400 ft. of underground pipeline which would cost approximately $34,000. The second well for injection was considered by the I'SOT community to be cost prohibitive. The cost of the injection well was derived from a memorandum of cost estimates prepared by Modoc Joint Unified School District for a similar project. An NPDES Permit has been obtained for the discharge of the geothermal water into the Pit River.

Approach to Environmental Review

The DOE is conducting a review of the potential environmental impacts that could result from implementation of the project. The review is being conducted in accordance with the requirements of NEPA. The DOE, as the federal lead agency, is required to consider whether their decision would result in significant impacts on the environment and, if so, to take actions to eliminate, avoid, compensate for, or reduce those impacts to a less than significant level.

In conducting the environmental review, the DOE first examined and verified information provided by I'SOT from previous reports and CEQA environmental documents. The DOE then consulted with government agencies that have permitting or statutory authority over all or part of the project or who have specialized knowledge of the project area. The DOE also consulted with the public and tribes about the scope of the issues the EA should cover. The DOE conducted additional studies and analyses as needed to identify any potentially significant impacts and identify measures, called mitigation measures that would avoid, eliminate, compensate for, or reduce any such impacts to a less than significant level. A significant impact is one that would exceed defined significance thresholds. An example of a significant effect to biological resources is a project impact that would have an adverse or harmful effect to a listed species or designated critical habitat.

Each environmental issue in this EA is analyzed based on comparison of the project impacts against accepted significance thresholds. When no specific threshold is suggested, professional judgment was used to develop appropriate significance criteria. The significance criteria are defined at the beginning of each impact analysis section. Potential impacts are categorized as follows: significant and unavoidable; significant, but mitigatable to a less than significant level; or less than significant.

Feasible mitigation measures are identified in this EA for adverse impacts. The measures are designed to reduce or eliminate adverse impacts. In many cases, I'SOT proposed design features as part of the project that would reduce impacts. For other potential impacts, the DOE has identified additional mitigation measures to those proposed by I'SOT. I'SOT has agreed to implement all design and mitigation measures as part of the project.

The DOE reviewed and considered all of the relevant permit requirements and approvals, which are listed in "Required Permits" in Section 1. This EA is based on the assumption that I'SOT would operate its

system within the parameters of the required permits (e.g. water discharge permit). For some construction and operation issues, the permit review processes of responsible federal, state, and local regulatory agencies require that I'SOT implement measures to ensure proper implementation of the project.

Affected Environment

CLIMATE AND AIR QUALITY

The climate in the project area is characterized by warm, dry summers and cool, moist winters. The project area elevation is at 4,300 ft; the majority of winter precipitation falls as snow. Air quality is good in the region, although the air basin is classified by the California Air Resources Board as nonattainment for PM_{10} (particulate matter less than 10 microns).

GEOLOGY AND MINERAL RESOURCES

The proposed project would be located within the town of Canby in the Modoc Plateau area. The presence of geothermal resources in this area is due to volcanic activity in the surrounding region. In addition to the large high temperature systems related to Cascade volcanism, the I'SOT site lies within a region of moderate to low temperature hydrothermal activity. The geothermal fluid is encountered in the fractured permeability within the rocks below 1,950 to the total depth of 2,100 ft below ground surface. Minor alteration including chlorinization of clays and silica deposition throughout the section reflects the elevated temperature gradient (7 degrees F/100ft).

HYDROLOGY AND GEOTHERMAL RESOURCES

The key hydrologic resources in the Canby project area are the groundwater, Pit River, and the geothermal resource. The Canby region is located in a complex geologic region between the *Cascade Range* and the *Basin and Range Region*. This tectonic setting produces a high temperature gradient (approximately 7degrees F/100 feet). The gradient provides the heat source for warm to moderate temperature groundwater aquifers at depths of over 1,000 feet. Where lithification and fractures provide permeability within the volcanic sequence, geothermal fluids can occur. Some of these warm waters flow to the surface as natural warm or hot springs. Most of the groundwater resources in the area are typically shallow, although some wells are as deep as 800 feet.

BIOLOGICAL RESOURCES

The area can be typified as being a high desert and is subject to extreme climatic conditions. Most of the habitat in the Modoc Plateau is juniper savannah, sagebrush steppe or wetland, which is also consistent with the area in and around Canby, California. Two major plant communities are found within the project area: sagebrush steppe, which has been converted to agricultural use, and wetlands. Characteristic Great Basin species, such as pronghorn and sage grouse, are year-round residents of the area. Mule deer from two herds use this area as winter range. Other wildlife in the area include bald eagle and several other bird species, and small mammals. The Pit River provides habitat for several species of fish, including Sacramento sucker, California roach, hardhead minnow, pike minnow, brown bullhead, and green sunfish.

CULTURAL RESOURCES AND TRADITIONAL CULTURAL VALUES

The project region has been traditionally used by the Pit River tribe. Many traditional use areas are located throughout the Modoc Plateau. The region includes known localities for hunting and gathering, mineral resources, social interaction, and medicinal/spiritual purposes, both historically and by present-day tribal peoples. This historical use is supported by existing archaeological evidence from the project vicinity, which suggests that humans have been active in the area for approximately the last 10,000 years.

LAND USE

The primary land uses in the Canby area are agricultural and dry grazing land. The project area is primarily designated as Exclusive Agriculture, General Agriculture, and Residential. The US Forest Service and Bureau of Land Management own much of the land surrounding Canby that provides recreational opportunities for tourists. General recreational opportunities in the project area include fishing, hiking, camping, and cross-country skiing in winter.

NOISE

Ambient noise levels are low and typical of rural undeveloped areas. Man-made noise sources are primarily from trains due to the Southern Pacific Railroad to the north and vehicular traffic. State Route 139 travels north and south to the west of the project area. State Route 299 traverses through Canby, intersecting the proposed discharge pipeline route. The I'SOT Community is located along several County Roads including County Road 83, 203, 161, 82, and 54. Aircraft noise is due to an airplane landing strip is located roughly 0.8 miles from the I'SOT area. These roads and facilities contribute to ambient noise levels in the vicinity of the project.

INFRASTRUCTURE

Existing utilities and service systems for Canby include electricity, communication systems, and solid waste disposal. Surprise Valley Electrification Corporation provides electricity and solid waste is transported to the Canby Transfer Station by the Modoc County Department of Public Works. Citizens Communications provides telephone service.

AESTHETICS

Canby is located on the Modoc Plateau, which is a flat, open area dominated by dry ranchland and wetlands. The primary influence of humans on the visual landscape in the vicinity of the proposed action has been through ranching, cattle grazing, and geothermal activities.

SOCIOECONOMICS

Population in the project area is low. The nearest major city in the county is Alturas, which is 18 miles east of Canby. Employment in the region is in the areas of agriculture, recreation, mining, government, and development and construction.

TRANSPORTATION AND TRAFFIC

The vicinity of the proposed project is well accessed by several existing paved arterial roads, as well as many paved collector roads. Traffic volumes in the vicinity are very low and are typical of rural areas with

sparse populations. Travel on vicinity roads occurs primarily during the summer/fall months, the period of recreational and hunting use.

HEALTH AND SAFETY

Four basic hazard conditions are considered by Modoc County Planning Department: geologic hazards, seismic hazards, wildland fire hazards, and flood hazards. Geologic and seismic hazards are addressed in the geology section. Large areas of Modoc County are susceptible to wildland fire hazards; however, the project is located in a predominantly open, low vegetation area of Canby, not susceptible to these types of fires. The proposed project is located where minimal industrial uses have occurred. FEMA has designated the eastern, southeastern, and southern portions of Canby as flood hazard zones (FEMA 1984). These are agricultural areas and are potentially inundated by the Pit River. A portion of the discharge pipeline route south of State Route 299 until the discharge point would be located in the designated flood hazard area.

Environmental Consequences

EFFECTS OF THE PROPOSED ACTION AND MITIGATION MEASURES

The proposed project would cause a number of significant or potentially significant impacts if design and mitigation measures were not implemented as part of the project. Table ES-1 summarizes environmental effects of the project and the mitigation measures that were designed to avoid or eliminate adverse effects. The mitigation measures have been incorporated into the project as conditions of approval to mitigate or avoid environmental impacts that could result from implementation of the proposed project. This table includes all of the impacts for the proposed action identified in Chapter 4 of this EA that have the potential to result in a significant effect. No potentially significant or significant impacts were identified for the parameters of Geology, Land Use, Infrastructure, Aesthetics, and Socioeconomics. No mitigation is identified under these parameters; therefore, these sections are not included in this table. The project would not result in unavoidable, significantly, adverse impacts.

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
Air Quality	Dust emissions	**4.1-1**. I'SOT will limit all construction vehicles to 25 miles per hour or less on all unpaved roads to minimize dust generation.	Potentially Significant	Less than significant
Air Quality	Dust emissions	**4.1-2.** I'SOT will ensure that watering for dust suppression shall be applied throughout the construction area during the construction period. I'SOT will also ensure that	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		watering is applied for dust suppression at the dumpsites for excavated material during dumping of excess excavated material.		
Air Quality	Dust emissions	**4.1-3**. I'SOT will ensure that dump trucks used to transport bedding and trenching material shall be equipped with adequate cover material to prevent particulates from scattering along the transport route. I'SOT will also ensure that this cover material shall be used when transporting project-related bedding and trenching material. In addition, I'SOT shall ensure that watering for dust suppression shall be performed at dumpsites for excavated material during dumping of excess excavated material.	Potentially Significant	Less than significant
Hydrology	Potential for pipeline breakage	**4.3-1**. I'SOT will design and construct the pipeline according to standard engineering practices and codes such as American Water Works Association (AWWA) or American Society of Mechanical Engineers (ASME) Power Piping Code B31.1.	Potentially Significant	Less than significant
Hydrology	Potential for groundwater contamination from pipeline breakage	**4.3-2**. I'SOT shall inspect the pipeline route on a monthly basis for possible pipeline damage generated from surface activities such as construction. Potential damage will be	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		investigated and repaired, if necessary. I'SOT shall, upon pipeline installation and on an annual basis thereafter, perform a pressure test of the discharge pipeline. The pressure test shall involve blocking the pipeline at the discharge point such that no discharge escapes, filling the pipeline with water, and observing the water level at the head of the pipeline over time. A fall in water level indicates a leak in the pipeline and shall be followed by shutdown of the geothermal flow. Use of the discharge pipeline shall not recommence until the leak is identified, repaired, and a further pressure test indicates the pipeline is sealed. The leakage limit will be will be set as the manufacturer's estimate for leakage under the project's operating conditions. I'SOT shall provide the results of this testing to NREL during the first 3 years of operation.		
Hydrology	Water quality and wildlife	**4.3-3.** The WDR sets 50 ng/L as the limit for mercury concentration in the effluent to be protective of water quality and wildlife. The GAC filter system removes 92-99% of incoming mercury yielding effluent mercury levels within a 2-19 ng/L range. Higher concentrations in the effluent may suggest declining filter efficacy. I'SOT will replace the GAC	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		filters according to manufacturer's specifications. The mercury concentration in the effluent will be monitored monthly for the first six months and quarterly thereafter. If mercury concentrations in the effluent are found to be 45 ng/L, I'SOT will replace the GAC filters.		
Biology	Vegetation and soil disturbance	**4.4-1.** To minimize the impacts to removed vegetation in the wetlands and other areas, during trenching, I'SOT will ensure that soil will be placed on either side of the trench. As much of the soil with its original vegetation as needed to return the ground to the original contour will be replaced immediately after the pipeline installation is completed. Due to the bedding material and pipe diameter, all of the removed soil will not refill into the trench; however, the fill soil will contain enough of the original vegetation to retain plant growth.	Significant	Less than significant
Biology	Drainage to wetlands	**4.4-2.** To reduce likelihood of affecting drainage in the wetlands, I'SOT will carefully plan the timing of project implementation. I'SOT will perform construction activities adjacent to drainages and wetlands when the probability of heavy rain is	Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		minimal and inundation of the project wetlands is reduced due to manipulation of the weirs. This driest time, when construction would be carried out, falls between February and March. Replacement of weir boards occurs on April 1st, causing the drained wetlands to be re-saturated by the summer months.		
Biology	Damage to eel-grass pondweed	**4.4-3.** I'SOT will place a sedimentation barrier fence adjacent to and on either side of the trench through the 0.03 acres of wetland. The fence shall remain in place until the construction is complete to prevent sediment from collecting on and damaging any eel-grass plants.	Potentially Significant	Less than significant
Biology	Pit River mercury concentration effects to fish and wildlife	~~**4.4-4.** The concentration of mercury in the effluent will be monitored monthly. The Pit River water concentration will also be monitored monthly at two stations, one 50 feet upstream from the point of discharge and the other 425 feet downstream from the point of discharge as stated in the NPDES permit.~~ ~~If the mercury concentration in the effluent exceeds the permit level of 50 ng/L, the proponent will coordinate with the RWQCB, CDFG, and USFWS to determine appropriate mitigation.~~	Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		~~Measures to reduce the effect could include, but are not limited to, temporary cessation of discharge temporary collection and proper disposal of discharge until the concentrations decrease, alternative filter systems, or injection of the spent geothermal fluids back into the geothermal reservoir.~~ I'SOT shall monitor the concentration of mercury in the effluent monthly for six months and quarterly thereafter Refer to Mitigation Measure 4.3-3 (Hydrology and Water Quality) for requirements for replacement of the GAC filters. I'SOT shall also monitor the Pit River water concentration monthly at two stations, one 50 feet upstream from the point of discharge and the other 425 feet downstream from the point of discharge as stated in the NPDES permit. I'SOT shall provide test results to NREL for the first 3 years of operation If the mercury concentration in the effluent exceeds the permit level of 50 ng/L, if concentration in the river exceeds 50 ng/L, or if assessment of the monitoring activities (including chronic toxicity testing, and fish residue analysis) suggests that		

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		discharge may result in significant increase in risk of mercury bioaccumulation in fish tissue I'SOT shall coordinate with the RWQCB, CDFG, and USFWS to determine appropriate mitigation. Measures to reduce the effect could include, but are not limited to, temporary cessation of discharge temporary collection and proper disposal of discharge until the concentrations decrease, alternative filter systems, or injection of the spent geothermal fluids back into the geothermal reservoir.		
Biology	Effects of mercury bioaccumulation in fish tissue and bald eagles	**4.4-5.** In accordance with the NPDES permit, I'SOT shall collect samples of Sacramento pike-minnow or other appropriate species will be collected and whole body concentrations of mercury will be determined at least every other year. I'SOT shall devise a sampling plan with the species of fish, number to be collected, the age of the fish and the method of aging in consultation with USFWS and CDFG. The sampling plan and protocol shall be submitted to the Executive Officer of the CVRWQCB, USFWS, and CDFG for approval. ~~If fish tissue concentrations exceed 100 ng/g, then the proponent will coordinate with the RWQCB, CDFG, and USFWS to determine appropriate~~	Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		~~mitigation. Mitigation measures might include those measure outlined in Measure 4.4-4 to reduce mercury discharge to the river, as well as actions to improve or enhance local eagle foraging or nesting conditions in the area, as coordinated with USFWS and CDFG.~~ Current levels of mercury in fish tissue average 0.4 ng/g. The maximum projected increase in fish tissue concentration is to 0.895 ng/g. If the tissue mercury concentration averages above 5 ng/g, then the proponent will coordinate with the RWQCB, CDFG, and USFWS to determine appropriate mitigation. Mitigation measures might include those measure outlined in Measure 4.3-5 to reduce mercury discharge to the river, as well as actions to improve or enhance local eagle foraging or nesting conditions in the area, as coordinated with USFWS and CDFG.		
Cultural Resources	Potential to affect undiscovered resources	**4.5-1**. During pipeline installation I'SOT shall contract for a tribal monitor to check for any Indian cultural resources or human remains. Mitigation to avoid effects to resources encountered might include avoidance or data collection.	Potentially Significant	Less than significant
Cultural	Potential to affect	**4.5-2**. Should any	Potentially	Less than

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
Resources	undiscovered resources	prehistoric or historic resources be encountered during site construction activities, I'SOT shall suspend construction activities within 50 feet of the discovery until a qualified consulting archaeologist has assessed the materials. If a decision is made to record the site, I'SOT shall ensure that recordation shall take place and it will be determined whether project well sites could be relocated to avoid any additional effects. I'SOT shall not resume construction activities in the vicinity of the discovery until consultation has taken place and the resources have been appropriately evaluated or treated and specific authorization to resume construction activities is provided by the DOE. If avoidance is not feasible, I'SOT shall ensure that a qualified archaeologist will evaluate the site and a determination of eligibility for the NRHP shall be made. If the site is determined to be eligible, then I'SOT shall submit a mitigation proposal (which may include a data recovery program similar to those conducted for similar resources in the vicinity) with the site record to the SHPO for review and concurrence.	Significant	significant
Cultural Resources	Potential to affect undiscovered remains	**4.5-3**. If prehistoric archaeological deposits that include human	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
	remains	remains or objects considered "cultural items" according to the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during site construction activities, I'SOT shall immediately notify the County Coroner and a qualified archaeologist and would follow NAGPRA regulations. If the remains are identified as American Indian, then I'SOT shall notify local American Indian groups or tribe(s) and the Native American Heritage Commission (NAHC) within 24 hours and initiate consultation. I'SOT shall ensure that the most likely descendants of these remains are notified and given the opportunity to make recommendations for the remains. If descendant recommendations are made which are not acceptable to I'SOT or DOE, then the NAHC would be requested to mediate the problem.		
Noise	Noise impacts of construction	**4.7-1**. I'SOT will ensure that muffler systems shall be used on all heavy equipment during construction activities.	Potentially Significant	Less than significant
Noise	Noise impacts of construction	**4.7-2**. As required by the Modoc County General Plan, I'SOT will submit building permits for the project to the Modoc	Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		County Planning Department for review for consistency with the noise element and other elements.		
Transportation and Traffic	Damage to roadway integrity	**4.11-1.** I'SOT will ensure that construction activities comply with all conditions of the Caltrans Encroachment Permit. These measures would minimize the chance of roadway damage during the jack and bore (HDD) process and would include the following: a. All equipment used on the paved surface of the State highway shall be rubber tired or rubber tracked, and meets the weight requirements for operation on a State highway. b. Any trench or excavation within 15 ft of the edge of the traveled way or 10 ft from the edge of pavement, whichever is greater, shall be closed. c. All work authorized herein shall be performed during daylight hours only. No work shall be performed during inclement weather. d. The minimum depth of cover over the	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		bore casing within the State's right-of-way shall be 7.5 ft for high-risk uncased gas mains or 6 ft and 5 ft below any drainage facility. e. No open cutting of the roadway prism is permitted. f. Trenches and boring pits outside of the highway prism shall be backfilled with material approved by State's representative. g. HDD operators are required to have basic training on HDD rigs via the dealerships – Vermeer, Ditch Witch, American Auger, etc., and have proof of training in their possession. I'SOT will make a videotape before and after HDD operations to document roadway integrity has been unchanged or to determine if permittee is liable for damages to the State highway caused by his operation. I'SOT will repair any damage caused by the construction, as required by Caltrans.		
Transportation and Traffic	Effects to roads	**4.11-2.** I'SOT will ensure that no vehicle used in construction or material delivery shall exceed the d i l d li i f h	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		design load limit of the various roadways that may be used during construction.		
Transportation and Traffic	Effects to roads	**4.11-3**. I'SOT will ensure that no construction equipment that utilizes tractor treads shall travel upon any public roadway.	Potentially Significant	Less than significant
Transportation and Traffic	Effects to roads	**4.11-4.** I'SOT will ensure that no construction equipment shall operate or park within 5-feet of either edge of a pavement edge.	Potentially Significant	Less than significant
Human Health & Safety	Public safety during construction	**4.12-1.** Prior to project commencement, I'SOT will submit a site construction and safety plan to the Director of the Modoc County Planning Department for review and approval. The purpose of the plan shall be to ensure public safety during all phases of project construction through: a. The installation of safety signage, placed as appropriate within the construction corridor, that warns of risks associated with on-site construction activities and outlines measures to be taken to ensure safe use of facilities near construction areas and avoidance of active construction equipment b. The installation of	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		temporary safety fencing to restrict or prevent public access to active on-site construction sites or equipment		
Human Health & Safety	Impacts of potential spills on health and safety	**4.12-2.** Prior to project commencement I'SOT will submit to the Director of the Modoc County Planning Department for review and approval a safety plan. The purpose of the plan is to minimize the exposure of the public to potentially hazardous materials during all phases of the project through: a. Appropriate methods (e.g., Best Management Practices) and approved containment and spill-control practices (e.g., spill control plan) for transport and storage of chemicals and materials on-site b. Safety signage, placed as appropriate along the construction corridor during construction or repairs, that warns of risks associated with on-site construction materials and outlines measures to be taken to ensure safe use of facilities near construction areas and avoidance	Potentially Significant	Less than significant

Table ES-1: Summary of Monitoring and Mitigation Considered as Project Conditions

Impact Type	Impact	Mitigation Measure	Level of Significance without Mitigation	Level of Significance with Mitigation
		of construction materials c. Temporary safety fencing during construction or repairs to restrict or prevent public access to active on-site construction materials or chemicals		
Human Health & Safety	Potential for fire risk	**4.12-3**. I'SOT will ensure that all construction equipment will be equipped with fire potential reduction equipment, such as but not limited to spark arresters, mufflers, etc.	Potentially Significant	Less than significant
Human Health & Safety	Potential for fire risk	**4.12-4**. I'SOT will ensure that fire preventative measures are taken during potentially hazardous operations, such as welding.	Potentially Significant	Less than significant
Human Health & Safety	Potential for fire risk	**4.12-5**. I'SOT will ensure that fire fighting equipment is supplied to the project site. Fire detectors, fire extinguishers, and hand-held fire fighting equipment would be available and maintained at the mechanical control building as well as the food service/laundry building for the duration of the project.	Potentially Significant	Less than significant

CUMULATIVE IMPACTS

NEPA requires that potential cumulative impacts be assessed by developing either a list of past, present, and probable future projects that would produce related or cumulative effects in combination with the I'SOT project, or a summary of projections contained in adopted general plans or related planning

documents. The discussion of cumulative impacts in Chapter 5 of this EA describes the potential cumulative impacts for each resource topic. For purposes of this analysis, the geographic scope of this impact assessment is limited to the one-mile study area adjacent to and surrounding the proposed project pipeline route, except for the 10-mile eagle area of influence analyzed for biological resources impacts. Air quality issues are examined in the context of the Northeast Plateau Air Basin.

Most of the project's effects would be temporary, such as the potential impacts associated with construction. Many of the long-term effects are either not additive to the effects of other projects or are so minor as to be not cumulatively considerable. Mercury discharged to the Pit River by the proposed project would not be cumulatively significant when compared to existing Pit River mercury levels and the amount of mercury added to the river by Kelley Hot Springs, approximately 2 miles upstream. The project would not result in significant cumulative effects.

UNAVOIDABLE ADVERSE EFFECTS

The unavoidable adverse effects of the project are described in Chapter 4. The project would not cause unavoidable adverse impacts with the inclusion of the above measures as conditions of the proposed action.

IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

The irreversible and irretrievable commitment of resources is described in Chapter 4. The use of geothermal waters is considered an irreversible commitment of resources however; the level of withdrawal from the geothermal resource (approximately 40 gpm) is relatively low compared to the potential production capability of the geothermal resource. The irreversible use of the geothermal resource is not considered a significant effect on the resource.